Antibiotic Stewardship and QAPI Workshop

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Moderators

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- Greg Lott RN (Jewish Home)
- Rosemary Novick RN (MCH)
- Cori Averill (MCH)
- Carol Tinoglio RN (Shorewinds)
- Dr. Sarah Howd MD (URMGG)
- Gail Quinlan RN (URMC)
- Grant Barney (URMC)
Acknowledgements

• Christina Felsen
• Courtney Lesperance
• Dan Parr
Objectives

• Explain antibiotic stewardship and the basics of Quality Assurance Performance Improvement

• Be able to track antibiotic usage using the proposed tool

• Create antibiotic stewardship policy

• Interpret a run chart for significant change
Tracking Data

• Very important to develop for each facility
• May be different depending on the facility
• Morning report, chart review, infection prevention nurse, MDS, etc.
• Antibiotic Tracking Sheet?
Tracking Data

- What data is worth tracking?
- What makes data meaningful?
- Need to ensure that the source is consistent and reliable
- Is the data affected by interventions proposed?
<table>
<thead>
<tr>
<th>Room #</th>
<th>Name</th>
<th>Antibiotics</th>
<th>Reason</th>
<th>End Date</th>
<th>O2 Usage</th>
<th>MD Order</th>
<th>MD Visit</th>
<th>Impaired Skin</th>
<th>Labs Due</th>
<th>Precautions</th>
</tr>
</thead>
<tbody>
<tr>
<td>23 A</td>
<td>Joseph Smith</td>
<td></td>
<td>continues on abx for pneumonia, VSS, no fever, cough, no imfight.</td>
<td>11-7</td>
<td>75% or dinner</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>44 B</td>
<td>Marjorie Full</td>
<td></td>
<td>complaints, mild confusion, no other issues.</td>
<td>3-11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30 A</td>
<td>Jamie Lennon</td>
<td></td>
<td>fell on day shift, fell on floor, no injuries. All precautions.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>85 D</td>
<td>Ned Stark</td>
<td></td>
<td>on abx for UTI, day 2 of backache, wince ex, moving E, col.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

HCO/14
24 hr report 2 pg nor

Day Nurse Signature  Evening Nurse Signature  Night Nurse Signature
Nursing Supervisor Signature  Nursing Supervisor Signature  Nursing Supervisor Signature
Important Data

- Antibiotics being started (what and when)
- Antibiotics being stopped
- Culture results
- Symptoms
- 72 hour reassessment
- Prescriber
Days of Therapy (DOT)

• One of the two graphs that are generated for you

• Means: Days of antibiotic therapy

• Difference between DOT and antibiotic starts
Antibiotic Start Rate

- Second graph that will be generated for you
- Looks at the antibiotic total starts
- Be careful of antibiotics started outside of the facility (i.e. hospital)
What Counts???

• Resident is started on an antibiotic in the ED or in the hospital

• Antibiotic is started in one month and course finished the next month

• Short term stay vs. Long term stay

• Finish antibiotic course after discharge from facility
How Can Data be Used

• Trend Data
• Graph Data
• Develop prescribing patterns (Info about behavior)
• Find unexpected relationships
• Fix a problem before it is a huge problem
What Data Can’t Do

- Read your mind
- Analyze and Interpret (humans do this)
- Predict the future with certainty
- Clinically treat the patient

Tracking Data (Electronic Vs. Paper)

Pros:
• Easier to read
• Easier to track data
• Can manipulate
• Track larger amounts of data
• Transport easier

Cons:
• Can be intimidating
• Harder to fix?
WHEN IT COMES TO DATA ANALYSIS

I EXCEL
Antibiotic Tracking Tool

- Developed to provide a easy to use format to track infections
- Meant to just be plug and play but some training needed
- Instruction Sheet
- Have fun with it!
Antibiotic Tracking Tool Demonstration
Breakout Session #1

- How can this be done at your facility?
- Where and how can you get the data?
- Practice filling out the antibiotic tool using an example
How to Interpret the Data

• This is the key to the tool

• If not interpreted well can lead to errors

• Important because this is what leads to action
Table 1. When to Order Urine Testing for Suspected UTI:

Does resident have an indwelling catheter?

NO

One or more of:
- **Acute dysuria** or acute pain, swelling, or tenderness of the testes, epididymis, or prostate
- **Fever* AND at least 1 of the following:**
  - New worsening urgency
  - New or worsening frequency
  - New or worsening urinary incontinence
  - Gross hematuria
  - Suprapubic pain or costovertebral angle tenderness
- **No Fever + 2 or more of the above symptoms**

Criteria met?
- YES, Test indicated
- NO, Test not indicated

YES

One or more of:
- Fever*
- Rigors
- New onset hypotension
- New onset confusion/functional decline w/ no other diagnosis
- Suprapubic/flank pain
- New pain, swelling, or tenderness in testicles or prostate
- Pus around catheter

Criteria met?
- YES, Test indicated
- NO, Test not indicated

*Fever: Single oral temp >37.8°C (100°F), or repeat oral temps >37.2°C (99°F) or rectal temps >37.5°C (99.5°F), or single temp >1.1°C (2°F) over baseline from any site (oral, tympanic, axillary)
Table 2. When to **TREAT** for UTI:

**Suspected UTI**

**Urinary Symptoms Present**

- Are any **warning signs** present?
  - □ Fever
  - □ Rigors
  - □ Unstable vital signs
  - □ New mental status change *(Only for patients w/ catheter)*

- **YES**
  - Treat empirically
  - Reassess treatment within 48-72 hours when culture results available

- **NO**
  - Consider waiting if symptoms are mild pending culture result
  - Reevaluate patient at 48 hours when urine culture is available to assess if treatment needed or should be changed

**NO Urinary symptoms**

- Do not treat **UNLESS** warning signs present

- Continue to monitor patient for symptoms

Crnich and Drinka. Annals Long Term Care 2014;22(9)
Reassessment

- Should be done 48-72 hours after starting antibiotics

- Important for reassessing the “appropriate” use of antibiotics.

- Can lead to reducing total days of antibiotic therapy (DOT)
Meeting the Standard

- Is your facility prescribing too many antibiotics?

- Is your facility readdressing antibiotics in a timely manner?

- Are certain prescribers using antibiotics more often?

- Are antibiotics used according to proven criteria?
Who gets the feedback

- Providers
  - Medical directors should assist
  - Give raw data

- QAPI committee
  - Facility wide rates
How to Improve

• Can you directly effect prescribing of antibiotics?

• How would you do this at your facility?

• Antibiotic Stewardship = Quality Care

• Requires administration, nursing staff and providers to work as a team!
In God we trust, all others bring data.

-W. Edward Deming
Types of Data

Continuous
Any variable measured on a continuum or scale that can be infinitely divided.

Example: Lead time, cost or price, duration of call, physical dimensions (height, weight, temperature).

Discrete
1. Counts or percentage
2. Binomial data: Data that can have only one of two values.

Ex: Yes/No, Pass/Fail.
Data

**Discrete**
- Type of facility
- Number of bed in a facility
- Family Size
- # of aides on duty
- # admissions per year
- Contracts Sold Per Month

**Continuous**
- Height
- Weight
- Temperature
- Age
- Pulse Rate
- Lab Turnaround Time
- Contribution Margin
**Input vs. Output Data**

*Inputs* to a process and *Process measures* are often measured and tracked in an effort to predict process *outcomes*.

Output measures quantify the overall performance of the process. Output measures provide the best barometer of process performance.

- **Input**
  - Arrival time
  - Accuracy
  - Cost
  - How well do these...

- **Process**
  - Steps A thru Z
  - Time per Task
  - In-process Errors

- **Output**
  - Customer Satisfaction
  - Total Defects
  - Lead Time
  - Profit
  - ... Predict These?
Common Metric For Comparison
Which Process is Performing Best?

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<th>Performance</th>
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<td>50 +/- 5 Minutes ave OR turnaround time</td>
</tr>
<tr>
<td>Billing</td>
<td>98 +/- 1% Accuracy</td>
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<tr>
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# Common Metric For Comparison

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**Take Home Point:** Metrics don't stand alone! In order to interpret data, you need to understand the process and how/if the data is standardized.
Incidence

Incidence = Number of new “whatevers” / time

Time = bed days of care (BDOC) = Average census x time

For example:

- If assume stable census of 100 elders in the month of September (30 days) then BDOC = 30 x 100 = 3000

Multiply incidence by 1000 to get # per 1000 resident days
Incidence: Example

- Shady Spot Nursing Home had 5 new UTIs in the month of September. Their census was stable at 100 residents.

- What is their incidence of UTIs?
Incidence: Example

Resident days of care =
100 residents x 30 days = 3000 resident days of care

Incidence = 5 UTI/3000 resident days of care

= 1.7 UTIs / 1000 resident days
Prevalence

- Prevalence is the total number of events (or cases for a disease) in a population at a given time.

- Number of “whatevers”/Number in population
Prevalence: Example

- Shady Spot NH has 4 residents with pressure ulcers.

- What is the prevalence of pressure ulcers in the facility?
Prevalence

\[
\frac{4 \text{ residents with ulcers}}{100 \text{ residents at risk}} \times 100 = 0.4 \times 100 = 4\% 
\]
Data Consistency and Stability

Data collection is a process, and like any process, it will have variation.

- Measurement process must be accurate
- Variation in the measurement process should be consistent over time.

Take – home point:
The reproducibility and accuracy of the measurement should be known for both discrete & continuous data.
Data Collection

After determining what data needs to be collected, you are ready to define the method for collecting and recording data.
The methods for collecting the data include:

A written procedure:
- What will be measured
- Sampling plan (what, where, when, how much data)
- Who will record the data
- What tools will be used to measure

Data collection form
- A tool to facilitate data collection
- A checklist to assure that all elements are included
Plotting Data

Most problems can be expressed as a **line graph** showing the current trend & desired reduction in either cycle time, defects, or cost.
Types of variation

- **Common cause (unassignable)**
  - Arises from factors inherent in the process
  - “noise”

- **Special cause (assignable)**
  - Arises from factors outside the process
  - Outside the ordinary
  - Can be a signal that the process has changed

Neither type of variation is good or bad in itself – not trying to differentiate because we want to get rid of one and not the other
Line Graphs (Run Charts)

- Allow a team to study observed data for trends or patterns over a specified period of time.
- Allow a team to compare a performance measure before and after implementation of a solution, to measure its impact.
- Focus attention on truly vital changes in the process.
Creating a Line Graph (Run Chart)

1. **Decide** on the process performance measure.
2. **Gather** data (generally 20 – 25 data points to detect meaningful patterns)
3. **Create a graph** with a vertical line (y axis) and a horizontal line (x axis):
   - On the vertical line (y axis), draw the scale related to the variable being measured
   - On the horizontal line (x axis), draw the time or sequence scale.
4. **Plot the data:** Look at the data if there are no trends, calculate the average or arithmetic mean.
5. **Draw a horizontal line at the average value.**
Anatomy of a Line Graph

Performance measure “Y data”

Shady Spot Falls Reduction Project
2012-2013

Falls per 1000 Resident Days

UNIT A
UNIT B
UNIT C

Time “x data”
Medication Errors Rate
Medication Errors Rate
Medication Errors Rate

UNIVERSITY of ROCHESTER
Medication Errors Rate
Medication Errors Rate
Coin Flip

50 people- 25 times- # Heads
Run Chart Interpretation

• Based on statistical probability rules
• Influenced by:
  • How often new data is available/added
  • Criticality of data (potential for harm)
A Guide to Interpreting Run Charts

- Critical thinking is key.
- In general, the more points a run chart has the more reliable interpretation can be.
- Frequency of data is an important consideration.
  - If you track falls on a daily basis, you may wait for 10 data points before reacting to a change.
  - If you track falls on a monthly basis, waiting for 10 data points before reacting may miss the boat.
- Criticality of data is an import
  - Sentinel events = immediate response.
  - Near-sentinel events = may require urgent response.
Median Lines

- **When:** If run chart data has only common cause variations, you can identify your median line.
- **What:** Median ≠ Average (mean)
- **Median:** the middle number
  - Half the values above, half below
- **Once calculated, the median is fixed**
  - New data does not change the median line calculation
Rule 1 = Shift
6 or more points on one side of the Median

Falls per 1000 bed day

- Falls rate
- Week
- Median
Rule 2 = Trend
5 or more points all going in the same direction
Rule 3 = Runs (Series of points on one side)
Too few or too many points crossing the median

![Graph showing 30 day Re-admissions]

**Data line crosses once**
Too few runs: total 2 runs
Rule 4 = Astronomical point
A point obviously different point
Significant Change? #1

![Line graph showing significant change over time. The graph has a black line representing events and a grey line representing the median. The x-axis represents time from 1 to 20, and the y-axis represents a scale from 0 to 20. The graph shows fluctuations in events with a median line indicating stability.]
Significant Change? #2
Significant Change? #3
Breakout Session #2

- Practice interpreting data
- Are UTI criteria being met at your facility?
- How can you improve this at your facility?
- How do you give provider feedback?
Policy Review

• Ideal way for facilities to demonstrate their antibiotic stewardship program

• Some elements will be consistent across all facilities

• However, some aspects and details may vary

• Involvement of IP nurse, medical director, DON, pharmacy, etc.
Policy Example

• Purpose

• Policy

• Procedure
1. The Medical Team will optimize antibiotic use.

   a) Clinical symptoms, labs, and radiological findings are indicated only to confirm clinical evidence of an infection.

   b) **Antibiotics will be used for the shortest period possible while being effective.**

   c) The prescriber will justify and document the indication for antibiotics.

   d) Re-culture after course of antibiotics is not typically necessary.

   e) Medical will only order antibiotic therapy when it will be beneficial to the resident.

   f) Ordering narrow spectrum antibiotics versus broad spectrum antibiotics as indicated.

   g) **Adjusting antibiotic doses based on drug levels and organ function.**

   h) Changing antibiotic from IV to an equally effective oral drug.

   i) Medical will provide information on the risks and benefits of antibiotic use in the elderly including the risk of increase resistance to drugs and the risk of C-Diff as the need arises.
2. The IP Nurse will

   a) Observe for trends, concurrent prospective and retrospective review of antimicrobial use.
   
   b) Culture and sensitivity reports are reviewed routinely as part of the surveillance of infection.
   
   c) Communication with Medical Director as necessary to convey findings and recommendations.
   
   d) Provide education to nursing staff on the difference between colonization and infection and multi-drug resistant organism prevention. Provide education on any trends that are found.
   
   e) Surveillance of multi-drug resistant organisms in regards to antibiotic therapy.
   
   f) Antibiotic use and infections will be tracked and documented via tracking sheet and algorithms of antibiotic use. The information from these reports will be used to determine to a benchmark and assist with determining the success of the Antibiotic Stewardship program.
   
   g) The IP nurse presents the antibiotic usage to the Medical Director monthly. The Medical Director will give feedback to the providers about antibiotic use.
3. The Consulting Pharmacist will monitor and track
   a) IV and oral antibiotic utilization and pattern of use.
   b) Antibiotics with no expiration dates access the possibility for discontinuation.
   c) Duplicate antibiotic therapies in which multiple antibiotics are prescribed that cover the same organisms.
   d) Most common infections and organisms in facility.
   e) The Consulting Pharmacist review reports and antibiotic usage data including numbers of antibiotics prescribed and the number of residents treated each month.

4. The information collected on infections and antibiotic use will be presented to the QAA Committee quarterly.
Breakout Session #3

- Review and discuss the policy
- How would this change at your facility?
Questions

?